Ultrasonic sensors
Contents:

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Ultrasonic sensors
Overview and advantages

- Distance measurement using the ultrasonic principle
- Measurement ranges to 6000mm

Distance information largely independent of surface properties

Outputs:
- 2 switching outputs
- analogue current output
- analogue voltage output

Operating principles:
- LSU models
- RKU models
- HRTU models with background suppression
- VRTU models with foreground and background suppression

Models HRTU 418M/V… and VRTU 430M/V… can be configured via PC software and programming terminal

Construction
- Series 8 cubic housing
- Series 18 cubic housing
- Cylindrical housing M18
- Cylindrical housing M30
Special features of the ultrasonic sensors

**Series 8**
- Throughbeam ultrasonic sensors
- Retro-reflective ultrasonic sensors
- Diffuse reflection ultrasonic scanners with background suppression
- Maximum operating range: 800mm
- PNP/NPN switching outputs
- M12 turning connector
- Protection class IP 67

**Series 418**
- Diffuse reflection ultrasonic scanners with background suppression
- Maximum operating range: 1000mm
- PNP switching output
- Analogue current and voltage output (0 … 20mA or 0 … 10V)
- Configuration of sensor and output functions via PC
- M12 connector
- Protection class IP 65, IP 67

- **Advantage 1**: Ideal for detection of transparent objects and liquids
- **Advantage 2**: Detection largely independent of surface properties
- **Advantage 3**: Large detection range
- **Advantage 4**: Compact construction
- **Advantage 5**: Easy operation
- **Advantage 6**: Teachable switching output
Series 430
- Diffuse reflection ultrasonic scanners with background suppression
- Maximum operating range: 6000mm
- PNP switching output
- Analogue current and voltage output (0 … 20mA or 0 … 10V)
- Configuration of sensor and output functions via PC
- M12 connector
- Protection class IP 65

Advantage 1: Ideal for detection of transparent objects and liquids
Advantage 2: Detection largely independent of surface properties
Advantage 3: Large detection range
Advantage 4: Flexible PC-configuration for adapting to the application
Advantage 5: Temperature-compensated version
Advantage 6: Synchronisation operation possible

Series 430
- Diffuse reflection ultrasonic scanners with background suppression
- Maximum operating range: 6000mm
- PNP switching output
- Analogue current and voltage output (0 … 20mA or 0 … 10V)
- Configuration of sensor and output functions via PC
- M12 connector
- Protection class IP 65

Advantage 1: Ideal for detection of transparent objects and liquids
Advantage 2: Detection largely independent of surface properties
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Advantage 5: Temperature-compensated version
Advantage 6: Synchronisation operation possible
Series 18
- Throughbeam ultrasonic sensors
- Stainless steel housing
- Teflon coated transducer
- Maximum operating range: 650mm
- PNP/NPN switching outputs
- Stainless steel M12 connector
- Protection class IP 67 and IP 69K
- **EcoLab** and **CleanProof**

✔ **Advantage 1**: Ideal for the detection of transparent objects (e.g. PET bottles in the infeed area of fillers and rinsers)

✔ **Advantage 2**: Ideal for the detection of PET bottles in linear transportation systems

✔ **Advantage 3**: Highly resistant to interference caused by compressed air

✔ **Advantage 4**: Short response behaviour for the detection of minimal gaps

✔ **Advantage 5**: High chemical resistance acc. to CleanProof® (see data sheet)
<table>
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<th>Operating principle</th>
<th>Operating range</th>
<th>Housing</th>
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<td>0 … 800 mm</td>
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<td>10 – 30 VDC</td>
<td>PNP transistor</td>
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LSU 8

Throughbeam ultrasonic sensor

0 ... 800 mm

- Colour and transmission independent detection of objects, even in wet and foggy environment
- Detection of narrow gaps
- Detection of fast moving objects
- Switching frequency 250 Hz
- M12 turning connector

20 - 30 V DC

Accessories:
(available separately • see page 42)
- Mounting systems
- Cable with M12 connector (K-D …)
- Control guard

Dimensioned drawing

Electrical connection

LSU 8/24-S12

LSU 8-S12
Specifications

Ultrasonic specifications
Operating range 1) 0 … 800 mm
Adjustment range 0 … 800 mm in steps
Ultrasonic frequency 300 kHz
Typ. opening angle see diagrams
Temperature drift ± 0.17%/K, see remarks

Timing
Switching frequency max. 250 Hz
Delay before start-up 2 ms

Electrical data
Operating voltage $U_B$ 20 … 30 V DC (incl. ± 10% residual ripple)
Residual ripple ± 10% of $U_B$
Bias current receiver ≤ 25 mA, transmitter ≤ 35 mA
Switching output 1 PNP and 1 NPN transistor
Function characteristics object detected
Output current max. 150 mA
Switch positions positions 1 … 5, see Tables

Indicators
Green LED ready
Yellow LED object detected

Mechanical data
Housing metal
Weight 70 g each
Connection type M12 connector, 5-pin (turning)

Environmental data
Ambient temp. (operation/storage) 0°C … +70°C/-40°C … +85°C
Protective circuit 2) 1, 2, 3
VDE safety class III
Protection class IP 67
Standards applied IEC 60947-5-2
Fitting position any

Order guide
With M12 connector
Transmitter LSU 8/24-S12 LSSU 8-S12 500 38914
Receiver LSEU 8/24-S12 500 38915

Tables

<table>
<thead>
<tr>
<th>Switch position 1)</th>
<th>Switching frequency [Hz]</th>
<th>Typical values 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A_{\max}$ [mm]</td>
<td>$O_{\min}$ [mm]</td>
<td>$L_{\min}$ [mm]</td>
</tr>
<tr>
<td>1</td>
<td>250</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
<td>200</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>150</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

1) Different adjustments may produce better values

Remarks

Approved purpose:
The throughbeam ultrasonic sensors are ultrasonic sensors for acoustic, contactless detection of objects.

Temperature drift ± 0.17%/K
LSU 18

Throughbeam ultrasonic sensor

- Colour and transmission independent detection of objects, even in extremely wet environments
- Optimised for container entry
- Stainless steel housing
- Teflon coated ultrasonic transducer
- Insensitive to chemical cleaning agents
- Detection of narrow gaps
- Detection of fast moving objects

0 ... 500mm

10 - 30 V DC

Accessories:

- Mounting systems
- Cable with M12 connector (K-D …)

Electrical connection

**LSU 18/4.52–S12**

<table>
<thead>
<tr>
<th align="left">10–30V DC</th>
<th align="left">1</th>
<th align="left">br/BN</th>
<th align="left">1</th>
<th align="left"></th>
</tr>
</thead>
<tbody>
<tr>
<td align="left">Sens 1</td>
<td align="left">2</td>
<td align="left">ws/WH</td>
<td align="left">2</td>
<td align="left"></td>
</tr>
<tr>
<td align="left">GND</td>
<td align="left">3</td>
<td align="left">bl/BU</td>
<td align="left">3</td>
<td align="left"></td>
</tr>
<tr>
<td align="left">Sens 2</td>
<td align="left">4</td>
<td align="left">sw/BK</td>
<td align="left">4</td>
<td align="left"></td>
</tr>
<tr>
<td align="left"></td>
<td align="left">5</td>
<td align="left">gr/GY</td>
<td align="left">5</td>
<td align="left"></td>
</tr>
</tbody>
</table>

**LSU 18,52–S12**

<table>
<thead>
<tr>
<th align="left">10–30V DC</th>
<th align="left">1</th>
<th align="left">br/BN</th>
<th align="left">1</th>
<th align="left"></th>
</tr>
</thead>
<tbody>
<tr>
<td align="left">NC</td>
<td align="left">2</td>
<td align="left">ws/WH</td>
<td align="left">2</td>
<td align="left"></td>
</tr>
<tr>
<td align="left">GND</td>
<td align="left">3</td>
<td align="left">bl/BU</td>
<td align="left">3</td>
<td align="left"></td>
</tr>
<tr>
<td align="left">NC</td>
<td align="left">4</td>
<td align="left">sw/BK</td>
<td align="left">4</td>
<td align="left"></td>
</tr>
<tr>
<td align="left">NC</td>
<td align="left">5</td>
<td align="left">gr/GY</td>
<td align="left">5</td>
<td align="left"></td>
</tr>
</tbody>
</table>

---

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LSU 18/4.52-S12 - 02
Specifications

Ultrasonic specifications
- Operating range: 0 ... 500mm
- Ultrasonic frequency: 300kHz
- Typ. opening angle: 12°
- Adjustment range: 0 ... 500mm in steps, see Tables

Timing
- Switching frequency: 200Hz
- Delay before start-up: 100ms

Electrical data
- Operating voltage $U_B$: 10 ... 30V DC (incl. ± 10% residual ripple)
- Residual ripple: ± 10% of $U_B$
- Bias current: receiver ≤ 15mA, transmitter ≤ 35mA
- Switching output: 1 PNP transistor (dark switching)
- Function characteristics object detected
- Output current max.: 150mA
- Range adjustment: external, via Sens 1 and Sens 2, see Tables

Mechanical data
- Housing: stainless steel
- Transducer: Teflon coated
- Weight: 90g each
- Connection type: M12 connector, stainless steel, 5-pin with gold-plated contacts

Environmental data
- Ambient temp. (operation/storage): 0°C ... +70°C/-40°C ... +85°C
- VDE safety class: III
- Protection class: IP 67, IP 69K
- Environmentally tested acc. to: ECOLAB, CleanProof+
- Standards applied: IEC 60947-5-2
- Fitting position: any
- Chemical resistance: tested in accordance with ECOLAB and CleanProof+ (see Chemical resistance)

Options
- Range adjustment: Sens 1 and Sens 2
- Active/not active: ≥ 8V / ≤ 2V or not connected
- Input resistance $R_{in}$: 10kΩ

Chemical resistance

<table>
<thead>
<tr>
<th>Product group</th>
<th>Product designation</th>
<th>Concentration</th>
<th>Temp.</th>
<th>Applic. time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foam cleaner</td>
<td>P3-topactive 200</td>
<td>4%</td>
<td>20°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Foam cleaner</td>
<td>P3-topax 19</td>
<td>5%</td>
<td>20°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Foam cleaner</td>
<td>P3-topax 56</td>
<td>5%</td>
<td>20°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Disinfection agent</td>
<td>P3-topax 91</td>
<td>3%</td>
<td>20°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Foam cleaner</td>
<td>P3-topactive 200</td>
<td>4%</td>
<td>50°C</td>
<td>21 days</td>
</tr>
<tr>
<td>Disinfection agent</td>
<td>P3-topactive DES</td>
<td>3%</td>
<td>50°C</td>
<td>21 days</td>
</tr>
<tr>
<td>Foam cleaner</td>
<td>P3-topax 52</td>
<td>5%</td>
<td>50°C</td>
<td>21 days</td>
</tr>
<tr>
<td>Disinfection agent</td>
<td>P3-topax 66</td>
<td>5%</td>
<td>50°C</td>
<td>21 days</td>
</tr>
<tr>
<td>Disinfection agent</td>
<td>P3-steryl</td>
<td>1%</td>
<td>50°C</td>
<td>21 days</td>
</tr>
<tr>
<td>Conveyor belt lubricant</td>
<td>P3-lupodrive</td>
<td>0.1%</td>
<td>50°C</td>
<td>21 days</td>
</tr>
<tr>
<td>Disinfection agent</td>
<td>Hydrogen peroxide $H_2O_2$</td>
<td>6%</td>
<td>20°C</td>
<td>21 days</td>
</tr>
<tr>
<td>Disinfection agent</td>
<td>Peracetic acid</td>
<td>1%</td>
<td>20°C</td>
<td>21 days</td>
</tr>
<tr>
<td>Disinfection agent</td>
<td>Ethanol</td>
<td>70%</td>
<td>20°C</td>
<td>10 hours *</td>
</tr>
</tbody>
</table>

* corresponds to approx. 5000 wipe cycles at 10 sec. per cycle.

ECOLAB Test procedure according to Ecolab F&E No. 40-1
CleanProof+ Leuze test procedure (based on Ecolab F&E No. 40-1)

Order guide

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel housing with M12 connector</td>
<td>LSU 18/4.52-S12</td>
</tr>
<tr>
<td>Transmitter</td>
<td>LSSU 18.52-S12</td>
</tr>
<tr>
<td>Receiver</td>
<td>LSEU 18/4.52-S12</td>
</tr>
</tbody>
</table>

Remarks
- Approved purpose: The throughbeam ultrasonic sensors are ultrasonic sensors for acoustic, contactless detection of objects.
- The response behaviour is dependent on the container shape.
- Direct spraying results in switching errors.
- Mount sensors in such a way that no drops can collect near the transducer.
LSU 18
Throughbeam ultrasonic sensor

- Colour and transmission independent detection of objects, even in humid and foggy environment
- Optimised for air transport systems
- Metal housing
-Insensitive to dust
- Detection of narrow gaps

0 ... 650 mm

10 - 30 V DC

Accessories:
(available separately • see page 42)
- Mounting systems
- Cable with M12 connector (K-D ...)
Specifications

Ultrasound specifications
- Operating range \(0 \ldots 650\text{mm}\)
- Adjustment range \(0 \ldots 650\text{mm in steps}\)
- Ultrasonic frequency \(300\text{kHz}\)
- Typ. opening angle \(12^\circ\)

Timing
- Switching frequency \(\text{max.} 100\text{Hz}\)
- Delay before start-up \(100\text{ms}\)

Electrical data
- Operating voltage \(U_B\) \(10 \ldots 30\text{V DC (incl. }\pm 10\%\text{ residual ripple)}\)
- Residual ripple \(\pm 10\%\text{ of }U_B\)
- Bias current receiver \(\leq 15\text{mA}\), transmitter \(\leq 35\text{mA}\)
- Switching output \(1\text{ PNP and }1\text{ NPN transistor}\)
- Function characteristics object detected
- Output current max. \(150\text{mA}\)
- Switch positions positions 1 \ldots 5, see Tables

Indicators
- Green LED ready
- Yellow LED object detected

Mechanical data
- Housing metal
- Weight \(70\text{g each}\)
- Connection type M12 connector, 5-pin

Environmental data
- Ambient temp. (operation/storage) \(0^\circ\text{C} \ldots +70^\circ\text{C/-40}^\circ\text{C} \ldots +85^\circ\text{C}\)
- Protective circuit \(=\text{short-circuit and overload protection, }2=\text{polarity reversal protection (not for analogue inputs), }3=\text{wire break and inductive protection}\)
- VDE safety class III
- Protection class IP 65
- Standards applied IEC 60947-5-2
- Fitting position any

Order guide

Table: Switch position

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Switching frequency [Hz]</th>
<th>Typical values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A_{\text{MAX}}</td>
<td>O_{\text{MIN}}</td>
</tr>
<tr>
<td>1</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>350</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>450</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>550</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
<td>650</td>
</tr>
</tbody>
</table>

Remarks

- Approved purpose:
  The throughbeam ultrasound sensors are ultrasonic sensors for acoustic, contactless detection of objects.
- The response behaviour is dependent on the container shape.
- Not suitable for use in wet environments. Avoid cleaning with cleaning agents.
RKU 8

Retro-reflective ultrasonic sensor

- Colour and transmission independent detection of objects, even in wet and foggy environment
- Switching behaviour largely independent of surface properties
- Teach function for adjustment
- M12 turning connector

0 … 400mm

20 - 30 V DC

Accessories:
(available separately • see page 42)
- Mounting systems
- Cable with M12 connector (K-D …)
- Control guard

Dimensioned drawing

Electrical connection

10–30VDC 1 br/BN
○ ○ 2 ws/WH
○ GND 3 bl/BU
○ ○ 4 sw/BK
Synch. 5 gr/GR

IEC 60947...

IEC 60947...

IP 67
Specifications

Ultrasonic specifications
- **Operating range**: 0...400mm
- **Adjustment range**: 160...435mm
- **Dead zone**: ≤ 35mm
- **Ultrasonic frequency**: 300kHz
- **Typ. opening angle**: see diagrams
- **Resolution**: 1mm
- **Reproducibility**: ± 1mm
- **Temperature drift**: ± 0.17%/K

Timing
- **Switching frequency**: 8Hz
- **Delay before start-up**: 250ms

Electrical data
- **Operating voltage** $U_B$: 20...30V DC (incl. ± 10% residual ripple)
- **Residual ripple**: ± 10% of $U_B$
- **Bias current**: ≤ 25mA
- **Switching output**: 1 PNP and 1 NPN transistor
- **Function characteristics**: reversible, object detected/not detected
- **Output current max.**: 150mA
- **Indicators**
  - Green LED: ready
  - Flashing green LED: teaching in progress
  - Yellow LED: object detected
  - Flashing yellow LED: device or teach error

Mechanical data
- **Housing**: metal
- **Weight**: 70g
- **Connection type**: M12 connector, 5-pin

Environmental data
- **Ambient temp. (operation/storage)**: -25°C to +70°C/-40°C to +85°C
- **Protective circuit**: 1=short-circuit and overload protection, 2=polarity reversal protection (not for analogue inputs), 3=wire break and inductive protection
- **VDE safety class**: III
- **Protection class**: IP 67
- **Standards applied**: IEC 60947-5-2
- **Fitting position**: any

Options
- **Synch. input**
- **Sensor synchronisation**: see remarks
- **Sensor active/not active**: $U_B$ or not connected/0V
- **Activation delay**: < 100ms

Teach process

1. Mount reflector at the desired distance (switching distance + dead zone) ON ON/OFF
2. Put step switch in position "Teach" - -
3. Wait for acknowledge signal
   - "Teach-in was successful" 1Hz ON
   - "Teach-in was not successful" ON 1Hz
4. Put step switch in position "Run"
   - Run ● Output is not active when object was detected ON OFF
   - Run ○ Output is active when object was detected ON ON

Order guide

With 8Hz max. switching frequency

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RKU 8/24-400-S12</td>
<td>500 38913</td>
</tr>
</tbody>
</table>

Remarks

● **Approved purpose**: The retro-reflective ultrasonic sensors are ultrasonic sensors for acoustic, contactless detection of objects.

● **Synchronisation**: Max. 10 sensors may be synchronised by connecting the Synch inputs. Thus, mutual interference can be avoided.

● **Temperature drift**: ± 0.17%/K
**RKU 418 RM/WM**

**Retro-reflective ultrasonic sensor**

0 ... 200 mm
0 ... 700 mm

- Colour and transmission independent detection of objects
- Switching behaviour largely independent of surface properties
- No dead zone
- Distance teachable
- Small construction

**Dimensioned drawing**

**Electrical connection**

<table>
<thead>
<tr>
<th>RKU 418 RM/WM/P...</th>
<th>br/BN</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30V DC4</td>
<td>ws/WH</td>
<td>2</td>
</tr>
<tr>
<td>TEACH</td>
<td>bl/BU</td>
<td>3</td>
</tr>
<tr>
<td>GND</td>
<td>sw/BK</td>
<td>4</td>
</tr>
<tr>
<td>Q1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Accessories:**
- Mounting systems
- Cable with M12 connector (K-D ...)

**Specifications and description**
Specifications

Ultrasonic specifications
RKU 418 ...-200-S12  
RKU 418 ...-700-S12  

Operating range 1)
0 ... 200mm 0 ... 700mm

Adjustment range
120 ... 220mm 350 ... 750mm

Dead zone
≤ 20mm in front of reflector ≤ 50mm in front of reflector

Ultrasonic frequency
400kHz 200kHz

Typ. opening angle
see diagrams

Direction of beam
RKU 418WM/P...: angular, 90°
RKU 418RM/P...: straight,

Temperature drift
± 0.17%/K

Timing
Switching frequency
10Hz 5Hz

Response time
50ms 100ms

Delay before start-up
20ms

Electrical data
Operating voltage UB
20 ... 30V DC (incl. ± 10% residual ripple)

Residual ripple
± 10% of UB

Bias current
≤ 20mA

Switching output
PNP transistor

Function characteristics
switching in case of object recognition

Output current
150mA

Switching range adjustment
Teach-in, teach input (pin 2) connected to GND for ≥ 3s

Indicators
Yellow LED
output activated

Flashing yellow LED
Teaching procedure

Mechanical data
Housing
metal / CuZn

Weight
50g

Connection type
M12 connector, plastic, 4-pin

Environmental data
Ambient temp. (operation/storage)
-25°C ... +70°C/-40°C ... +85°C

Protective circuit 2)
1, 2, 3

VDE safety class
III

Protection class
IP 65

Standards applied
IEC 60947-5-2

Fitting position
any

Tables

<table>
<thead>
<tr>
<th>RKU 418 ...-200-S12</th>
<th>RKU 418 ...-700-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance x [mm]</td>
<td>Distance x [mm]</td>
</tr>
<tr>
<td>Misalignment y [mm]</td>
<td>Misalignment y [mm]</td>
</tr>
</tbody>
</table>

1) For the complete temperature range, measured object ≥ 20x20mm
2) 1=short-circuit and overload protection, 2=polarity reversal protection, 3=wire break and inductive protection

Order guide

Range: 0 ... 200mm, direction of beam: straight
RKU 418RM/P-5020-200-S12 500 38637
RKU 418WM/P-5020-200-S12 500 38638

Range: 0 ... 200mm, direction of beam: 90°
RKU 418RM/P-3020-700-S12 500 38641
RKU 418WM/P-3020-700-S12 500 38642

Remarks

● Approved purpose:
The retro-reflective ultrasonic sensors are ultrasonic sensors for acoustic, contactless detection of objects.

● Teaching procedure:
Position reflector at the desired switching distance. Connect teach input (pin 2) to GND for ≥ 3s. Reconnect teach input to +UB or leave unconnected; switching output is taught.

● Temperature drift
± 0.17%/K
HRTU 8  Diffuse reflection ultrasonic scanner with background suppression

- Colour and transmission independent detection of objects, even in wet and foggy environment
- Switching behaviour largely independent of surface properties
- Teach function for adjustment
- M12 turning connector

50 ... 400mm

20 - 30 V DC

Accessories:
- Mounting systems
- Cable with M12 connector (K-D …)
- Control guard

Dimensioned drawing

Electrical connection

20–30VDC 1 br/BN
2 wS/Mh
3 bl/BU
4 bw/BK
5 gr/GY

IEC 60947... IEC 60947...
IP 67

IEC 60947...
Specifications

**Ultrasonic specifications**
- **HRTU 8/24-400-S12**
- Operating range: 50 ... 400 mm
- Adjust range: 60 ... 400 mm
- Ultrasonic frequency: 300 kHz
- Typ. opening angle: see diagrams
- Resolution: ± 1 mm
- Reproducibility: ± 1 mm
- Temperature drift: ± 0.17%/K

**Timing**
- Switching frequency: 8 Hz
- Delay before start-up: 250 ms

**Electrical data**
- Operating voltage \( U_B \): 20 ... 30 V DC (incl. ± 10% residual ripple)
- Residual ripple: ± 10% of \( U_B \)
- Bias current: ≤ 25 mA
- Switching output: 1 PNP and 1 NPN transistor
- Function characteristics: reversible, object detected/not detected
- Output current max.: 150 mA

**Indicators**
- Green LED: ready
- Flashing green LED: teaching in progress
- Yellow LED: reversible, object detected/not detected
- Flashing yellow LED: device or teach error

**Mechanical data**
- Housing: metal
- Weight: 70 g
- Connection type: M12 connector, 5-pin

**Environmental data**
- Ambient temp. (operation/storage): -25 °C ... +70 °C/-40 °C ... +85 °C
- Protective circuit: 1=short-circuit and overload protection, 2=polarity reversal protection (not for analogue inputs), 3=wire break and inductive protection
- VDE safety class: III
- Protection class: IP 67
- Standards applied: IEC 60947-5-2
- Fitting position: any

**Options**
- Synchronisation: Max. 10 sensors may be synchronised by connecting the Synch inputs. Thus, mutual interference can be avoided.
- Temperature drift: ± 0.17%/K

**Teach process**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Green LED</th>
<th>Yellow LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Place object at desired distance</td>
<td>ON</td>
<td>ON/OFF</td>
</tr>
<tr>
<td>2. Put step switch in position &quot;Teach&quot;</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Wait for acknowledge signal</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&quot;Teach-in was successful&quot;</td>
<td>1 Hz</td>
<td>ON</td>
</tr>
<tr>
<td>&quot;Teach-in was not successful&quot;</td>
<td>ON</td>
<td>1 Hz</td>
</tr>
<tr>
<td>4. Put step switch in position &quot;Run&quot;</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Run ☐ Output and yellow LED are not active when object was detected</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Run ● Output and yellow LED are active when object was detected</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

**Order guide**

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRTU 8/24-400-S12</td>
<td>500 38912</td>
</tr>
</tbody>
</table>
HRTU 418 RM/WM

- Colour and transmission independent detection of objects
- Switching behaviour largely independent of surface properties
- Distance teachable
- Small construction

30 … 200mm
100 … 700mm

20 - 30 V DC

UL LISTED

IEC 60947...

IP 65

Dimensioned drawing

Electrical connection

Accessories:
(available separately • see page 42)
- Mounting systems
- Cable with M12 connector (K-D …)

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HRTU 418RM/P-…-S12 - 05
HRTU 418WM/P-…-S12 - 05

– 20 –
Specifications

Ultrasonic specifications

<table>
<thead>
<tr>
<th>HRTU 418...-200-S12</th>
<th>HRTU 418...-700-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating range</td>
<td>30 ... 200mm</td>
</tr>
<tr>
<td></td>
<td>100 ... 700mm</td>
</tr>
<tr>
<td>Ultrasonic frequency</td>
<td>400kHz</td>
</tr>
<tr>
<td></td>
<td>200kHz</td>
</tr>
<tr>
<td>Typ. opening angle</td>
<td>1mm</td>
</tr>
<tr>
<td>Direction of beam</td>
<td>HRTU 418RM/P...: straight,</td>
</tr>
<tr>
<td></td>
<td>HRTU 418WM/P...: angular, 90°</td>
</tr>
<tr>
<td>Resolution</td>
<td>10mm</td>
</tr>
<tr>
<td>Reproducibility</td>
<td>± 1mm</td>
</tr>
<tr>
<td>Switching hysteresis</td>
<td>± 0.17%/K</td>
</tr>
<tr>
<td>Temperature drift</td>
<td>± 0.17%/K</td>
</tr>
</tbody>
</table>

Timing

<table>
<thead>
<tr>
<th>HRTU 418RM/P...</th>
<th>HRTU 418WM/P...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching frequency</td>
<td>10Hz</td>
</tr>
<tr>
<td>Response time</td>
<td>50ms</td>
</tr>
<tr>
<td>Delay before start-up</td>
<td>20ms</td>
</tr>
</tbody>
</table>

Electrical data

<table>
<thead>
<tr>
<th>HRTU 418RM/P...</th>
<th>HRTU 418WM/P...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage $U_B$</td>
<td>20 ... 30V DC (incl. ± 10% residual ripple)</td>
</tr>
<tr>
<td>Residual ripple</td>
<td>± 10% of $U_B$</td>
</tr>
<tr>
<td>Bias current</td>
<td>&lt; 20mA</td>
</tr>
<tr>
<td>Switching output</td>
<td>NPN transistor</td>
</tr>
<tr>
<td>Function characteristics</td>
<td>switching in case of object recognition</td>
</tr>
<tr>
<td>Output current</td>
<td>150mA</td>
</tr>
<tr>
<td>Switching range adjustment</td>
<td>teach-in, teach input (pin 2) connected to GND for ≥ 3s</td>
</tr>
</tbody>
</table>

Indicators

<table>
<thead>
<tr>
<th>HRTU 418RM/P...</th>
<th>HRTU 418WM/P...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow LED output activated</td>
<td>teaching procedure</td>
</tr>
</tbody>
</table>

Flash yellow LED

Mechanical data

<table>
<thead>
<tr>
<th>HRTU 418RM/P...</th>
<th>HRTU 418WM/P...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing metal / CuZn</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>50g</td>
</tr>
<tr>
<td>Connection type</td>
<td>M12 connector, plastic, 4-pin</td>
</tr>
</tbody>
</table>

Environmental data

<table>
<thead>
<tr>
<th>HRTU 418RM/P...</th>
<th>HRTU 418WM/P...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temp. operation/storage</td>
<td>-25°C ... +70°C/-40°C ... +85°C</td>
</tr>
<tr>
<td>VDE safety class</td>
<td>III</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 65</td>
</tr>
<tr>
<td>Standards applied</td>
<td>IEC 60947-5-2</td>
</tr>
<tr>
<td>Fitting position any</td>
<td></td>
</tr>
</tbody>
</table>

Remarks

1. For the complete temperature range, measured object ≥ 20x20mm
2. 1=short-circuit and overload protection, 2=polarity reversal protection, 3=wire break and inductive protection

Order guide

<table>
<thead>
<tr>
<th>HRTU 418RM/P-5020-200-S12</th>
<th>HRTU 418WM/P-5020-200-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation</td>
<td>Part No.</td>
</tr>
<tr>
<td>HRTU 418RM/P-5020-200-S12</td>
<td>500 38635</td>
</tr>
<tr>
<td>HRTU 418WM/P-5020-200-S12</td>
<td>500 38636</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HRTU 418RM/P-3020-700-S12</th>
<th>HRTU 418WM/P-3020-700-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation</td>
<td>Part No.</td>
</tr>
<tr>
<td>HRTU 418RM/P-3020-700-S12</td>
<td>500 38639</td>
</tr>
<tr>
<td>HRTU 418WM/P-3020-700-S12</td>
<td>500 38640</td>
</tr>
</tbody>
</table>
HRTU 418

Ultrasonic sensors

- Ideal for detection of levels of liquids, bulk materials, transparent media, ...
- Distance information largely independent of surface properties
- PC-configuration software for configuring sensor and switching output
- Up to 10 devices can be synchronised via the SYNC input
- Start and end of switching range adjustable separately via PC

50 ... 300 mm
150 ... 1000 mm

20 - 30 V DC

Accessories:
(available separately • see page 42)
- Mounting systems
- Cable with M12 connector (K-D ...)
- *USDS-Config* configuration software
  (free download from www.leuze.com)
- PGU 01 (programming unit)

Dimensioned drawing

Electrical connection

... 418M/P ...

20-30V DC  +  1  br/BN
SYNC      2  ws/WH
GND       3  bl/BU
Q1  ⊙     4  sw/BK
Specifications

Ultrasonic specifications
- Operating range: 50...300mm, 150...1000mm
- Ultrasonic frequency: 400kHz, 200kHz
- Opening angle: 6°
- Resolution: 1mm
- Absolute measurement accuracy: ±2.5% of measurement range end value
- Reproducibility: ±1mm, ±2mm
- Switching hysteresis: 10mm, 10mm

Timing
- Switching frequency (min.): 5Hz, 4Hz
- Response time (max.): 100ms, 120ms
- Delay before start-up: 280ms, 280ms

Electrical data
- Operating voltage: 20...30V DC (incl. ±10% residual ripple)
- Residual ripple: ±10% of UB
- Bias current: ≤60mA
- Switching output: PNP transistor
- Function characteristics: switching in case of object recognition
- Output current: 150mA
- Switching range adjustment: potentiometer 270°

Indicators
- Yellow LED
- Output activated

Mechanical data
- Housing: metal / CuZn
- Weight: 50g
- Connection type: M12 connector, plastic, 4-pin

Environmental data
- Ambient temp. (operation/storage): -25°C...+70°C/-40°C...+85°C
- Protective circuit: 1, 2, 3
- VDE safety class: III
- Protection class: IP 67
- Standards applied: IEC 60947-5-2
- Fitting position: any

Remarks
- Approved purpose: The ultrasonic sensors are used for acoustic, contactless detection of objects.

Order guide

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRTU 418M/P-5010-300-S12</td>
<td>500 36257</td>
</tr>
<tr>
<td>HRTU 418M/P-3010-1000-S12</td>
<td>500 36258</td>
</tr>
</tbody>
</table>

Tables

<table>
<thead>
<tr>
<th>Distance x [mm]</th>
<th>Misalignment y [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>-120</td>
</tr>
<tr>
<td>200</td>
<td>-100</td>
</tr>
<tr>
<td>300</td>
<td>-80</td>
</tr>
<tr>
<td>400</td>
<td>-60</td>
</tr>
<tr>
<td>500</td>
<td>-40</td>
</tr>
<tr>
<td>600</td>
<td>-20</td>
</tr>
<tr>
<td>700</td>
<td>0</td>
</tr>
<tr>
<td>800</td>
<td>20</td>
</tr>
<tr>
<td>900</td>
<td>40</td>
</tr>
<tr>
<td>1000</td>
<td>60</td>
</tr>
<tr>
<td>1100</td>
<td>80</td>
</tr>
<tr>
<td>1200</td>
<td>100</td>
</tr>
<tr>
<td>1300</td>
<td>120</td>
</tr>
<tr>
<td>1400</td>
<td>140</td>
</tr>
<tr>
<td>1500</td>
<td>160</td>
</tr>
</tbody>
</table>

The configuration software runs under Windows 95/98/NT/2000/XP and offers the following features:

- Configuration of multiplex operation
- Configuration of the sensor (attenuation, switching frequency, response time)
- Adjustment of the switching output (start/end of switching range, hysteresis, object present yes/no)
- Adjustment of the analogue output
- Support of various languages

Remarks

- Synchronisation: Mutual interference is excluded by connecting the sensors with the SYNC input.
HRTU 418 RM/WM

- Colour and transmission independent detection of objects
- Switching behaviour largely independent of surface properties
- Two mutually independent switching points
- Distance teachable
- Small construction

25 ... 400 mm
100 ... 700 mm

20 - 30 V DC

Accessories:
- Mounting systems
- Cable with M12 connector (K-D ...)

Dimensioned drawing

Electrical connection

20-30 V DC +

1 br/BN

2 ws/WH

3 bl/BU

4 sw/BK

5 gr/GY

IEC 60947...

UL

C LISTED

IEC 60947...

IP 65

Dimensioned drawing

Active surface

Indicator diode Q1, Q2
Specifications

**Ultrasonic specifications**

<table>
<thead>
<tr>
<th>HRTU 418...-400-S12</th>
<th>HRTU 418...-700-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating range 1)</td>
<td>25 ... 400mm</td>
</tr>
<tr>
<td></td>
<td>90 ... 700mm</td>
</tr>
<tr>
<td>Adjustment range</td>
<td>40 ... 300mm</td>
</tr>
<tr>
<td></td>
<td>75 ... 700mm</td>
</tr>
<tr>
<td>Ultrasonic frequency</td>
<td>300kHz</td>
</tr>
<tr>
<td></td>
<td>200kHz</td>
</tr>
<tr>
<td>Typ. opening angle</td>
<td>see diagrams</td>
</tr>
<tr>
<td>Direction of beam</td>
<td>HRTU 418RM/P...:</td>
</tr>
<tr>
<td></td>
<td>straight,</td>
</tr>
<tr>
<td></td>
<td>HRTU 418WM/P...:</td>
</tr>
<tr>
<td></td>
<td>angular, 90°</td>
</tr>
<tr>
<td>Reproducibility</td>
<td>± 1mm</td>
</tr>
<tr>
<td>Switching hysteresis</td>
<td>10mm</td>
</tr>
<tr>
<td>Temperature drift</td>
<td>± 0.17%/K</td>
</tr>
</tbody>
</table>

**Timing**

<table>
<thead>
<tr>
<th></th>
<th>HRTU 418...-400-S12</th>
<th>HRTU 418...-700-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching frequency</td>
<td>10Hz</td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>50ms</td>
<td></td>
</tr>
<tr>
<td>Delay before start-up</td>
<td>20ms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100ms</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Electrical data**

<table>
<thead>
<tr>
<th></th>
<th>HRTU 418...-400-S12</th>
<th>HRTU 418...-700-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage $U_B$</td>
<td>20 ... 30V DC (incl. ± 10% residual ripple)</td>
<td></td>
</tr>
<tr>
<td>Residual ripple</td>
<td>± 10% of $U_B$</td>
<td></td>
</tr>
<tr>
<td>Bias current</td>
<td>&lt; 20mA</td>
<td></td>
</tr>
<tr>
<td>Switching output</td>
<td>2x PNP transistor</td>
<td></td>
</tr>
<tr>
<td>Function characteristics</td>
<td>switching in case of object recognition</td>
<td></td>
</tr>
<tr>
<td>Output current</td>
<td>300mA</td>
<td></td>
</tr>
<tr>
<td>Switching range adjustment</td>
<td>teach-in Q1: teach input (pin 2) connected to GND for 3 ... 6s</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Indicators**

<table>
<thead>
<tr>
<th></th>
<th>HRTU 418...-400-S12</th>
<th>HRTU 418...-700-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow LED</td>
<td>output Q1, output Q2</td>
<td></td>
</tr>
<tr>
<td>Flashing yellow LED</td>
<td>teaching procedure</td>
<td></td>
</tr>
</tbody>
</table>

**Mechanical data**

<table>
<thead>
<tr>
<th></th>
<th>HRTU 418...-400-S12</th>
<th>HRTU 418...-700-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>metal/brass nickel-plated</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>50g</td>
<td></td>
</tr>
<tr>
<td>Connection type</td>
<td>M12 connector, plastic, 5-pin</td>
<td></td>
</tr>
</tbody>
</table>

**Environmental data**

<table>
<thead>
<tr>
<th></th>
<th>HRTU 418...-400-S12</th>
<th>HRTU 418...-700-S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temp. (operation/storage)</td>
<td>-25°C ... +70°C/-40°C ... +85°C</td>
<td></td>
</tr>
<tr>
<td>Protective circuit 2)</td>
<td>1, 2, 3</td>
<td></td>
</tr>
<tr>
<td>VDE safety class</td>
<td>III</td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 65</td>
<td></td>
</tr>
<tr>
<td>Standards applied</td>
<td>IEC 60947-5-2</td>
<td></td>
</tr>
<tr>
<td>Fitting position</td>
<td>any</td>
<td></td>
</tr>
</tbody>
</table>

1) For the complete temperature range, measured object ≥ 20x20mm
2) 1=short-circuit and overload protection, 2=polarity reversal protection, 3=wire break and inductive protection

**Order guide**

<table>
<thead>
<tr>
<th>Operating range: 25 ... 400mm, direction of beam: straight</th>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRTU 418RM/P-5220-400-S12</td>
<td>501 09016</td>
<td></td>
</tr>
<tr>
<td>HRTU 418RM/P-5220-700-S12</td>
<td>501 09018</td>
<td></td>
</tr>
<tr>
<td>HRTU 418WM/P-5220-400-S12</td>
<td>501 09017</td>
<td></td>
</tr>
<tr>
<td>HRTU 418WM/P-5220-700-S12</td>
<td>501 09019</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**

- Approved purpose: The ultrasonic sensors are used for acoustic, contactless detection of objects.
- Temperature drift ± 0.17%/K
Teach-in via input

1. Position measurement object at the desired distance.
2. The respective teach function is activated by applying GND to the teach input (pin 2).
   The teach event is signalled by slow flashing of the LEDs.

3. To finish the teach event, disconnect the teach input from GND or switch it to +U₂ after
   the desired time. If the teach event has not completed after 9s, it begins again with
   phase B.
4. A successful teach event is signalled by the end of the flashing.

Error messages

LEDs which continuously flash fast signal an unsuccessful teach event (sensor not ready):

<table>
<thead>
<tr>
<th>LED Q1</th>
<th>LED Q2</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>flashes rapidly</td>
<td>switching state output Q2</td>
<td>teach switching output Q1 unsuccessful</td>
</tr>
<tr>
<td>switching state output Q1</td>
<td>flashes rapidly</td>
<td>teach switching output Q1 unsuccessful</td>
</tr>
</tbody>
</table>

Remedy:
- Disconnect sensor from voltage to restore the old values.
- Repeat teach event

---

Teach function | Teach phase / duration of the teach signal | LED Q1 | LED Q2 |
---|---|---|---|
Teach preparation | A / 0 ... 3s | off | off |
switching output Q1 | B / 3 ... 6s | flashes | off |
switching output Q2 | C / 6 ... 9s | off | flashes |
We reserve the right to make changes. • USDS_05gb.fm

VRTU 430

Ultrasonic sensors

60 ... 300 mm
200 ... 1300 mm

- Ideal for detection of levels of liquids, bulk materials, transparent media, ...
- Distance information largely independent of surface properties
- PC-configuration software for configuring sensor and switching output
- Up to 10 devices can be synchronised via the SYNC input
- Separate adjustment of start and end of switching range (Q1) via potentiometer and PC

Accessories:
(available separately • see page 42)
- Cable with M12 connector (K-D ...)
- *USDS-Config* configuration software (free download from www.leuze.com)
- PGU 01 (programming unit)

Dimensioned drawing

A Potentiometer for end of switching range Q1
B Indicator diode Q2 only for 430M/P ...
C Indicator diode Q1
D Potentiometer for start of switching range Q1

Electrical connection

... 430M/P ...

20–30 V DC + 1 br/BN
SYNC 2 ws/WH
GND 3 bl/BU
Q1 4 sw/BK
Q2 5 gf/CY

Switching outputs Q1 and Q2 switch alternately!
Specifications

Ultrasonic specifications
- Operating range: 60 ... 300mm / 200 ... 1300mm
- Ultrasonic frequency: 400kHz / 200kHz
- Resolution: ≤ 1mm / ≥ 1mm
- Absolute measurement accuracy: ± 0.45mm / ± 2mm
- Reproducibility: 10mm / 10mm
- Switching hysteresis: 10mm

Timing
- Switching frequency (min.): 8Hz / 4Hz
- Response time: 80ms / 110ms
- Delay before start-up: 280ms / 280ms

Electrical data
- Operating voltage: UB = 20 ... 30VDC (incl. ± 10% residual ripple)
- Residual ripple: ± 10% of UB
- Bias current: ≤ 50mA (without load)
- Switching output: 2 PNP transistors
- Function characteristics: switching in case of object recognition
- Output current: 300mA
- Switching range adjustment: potentiometer 270°

Indicators
- Yellow LED
- Flasing yellow LED

Mechanical data
- Housing: metal / CuZn
- Weight: 210g
- Connection type: M12 connector, plastic, 5-pin

Environmental data
- Ambient temp. (operation/storage): -25°C ... +70°C / -40°C ... +85°C
- Protective circuit: 1=short-circuit and overload protection, 2=polarity reversal protection, 3=wire break and inductive protection
- VDE safety class: III
- Protection class: IP 65
- Standards applied: IEC 60947-5-2

Remarks
- Approved purpose: The ultrasonic sensors are used for acoustic, contactless detection of objects.

Order guide

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRTU 430M/P-5110-300-S12</td>
<td>500 36261</td>
</tr>
<tr>
<td>VRTU 430M/P-3110-1300-S12</td>
<td>500 36262</td>
</tr>
</tbody>
</table>

Tables

Diagrams

Remarks
- Synchronisation: Mutual interference is excluded by connecting the sensors with the SYNC input.

Configuration software “USDS-Config”

The configuration software runs under Windows 95/98/NT/2000/XP and offers the following features:
- Configuration of multiplex operation
- Configuration of the sensor (attenuation, switching frequency, response time)
- Adjustment of the switching output (start/end of switching range, hysteresis, object present yes/no)
- Adjustment of the analogue output
- Support of various languages
**VRTU 430**

**Ultrasonic sensors**

---

**Ideal for detection of levels of liquids, bulk materials, transparent media, …**

**Distance information largely independent of surface properties**

**PC-configuration software for configuring sensor and switching output**

**Up to 10 devices can be synchronised via the SYNC input**

**Separate adjustment of start and end of switching range (Q1) via potentiometer and PC**

---

**Accessories:**

- Cable with M12 connector (K-D …)
- "USDS-Config" configuration software (free download from www.leuze.com)
- PGU 01 (programming unit)

---

**Dimensioned drawing**

- Potentiometer for end of switching range Q1
- Indicator diode Q2 (only for VRTU 430M/P …)
- Indicator diode Q1
- Potentiometer for start of switching range Q1

---

**Electrical connection**

- Switching outputs Q1 and Q2 switch alternately!

---

**400 ... 3000 mm**

20 - 30 V DC

- **20 - 30 V DC**
- **SYNC**
- **GND**
- **Q1**
- **Q2**
- **br/BN**
- **ws/WH**
- **bl/BU**
- **sw/BK**
- **gr/GY**

---

**IEC 60947...**

**IP 65**

---

**Leuze electronic GmbH + Co. KG**

In der Braike 1 D-73277 Owen Tel. +49 (0) 7021 573-0

VRTU 430M/P-2110-3000-S12 - 05

---

Leuze electronic GmbH + Co. KG
info@leuze.de • www.leuze.com
Specifications

Ultrasonic specifications
- Operating range: 400 ... 3000mm
- Ultrasonic frequency: 120kHz
- Resolution: ≥ 1mm
- Absolute measurement accuracy: ± 1.5% of the measurement range end value
- Reproducibility: ± 5mm
- Switching hysteresis: 20mm

Timing
- Switching frequency (min.): 2Hz
- Response time (max.): 200ms
- Delay before start-up: 280ms

Electrical data
- Operating voltage $U_B$: 20 ... 30VDC (incl. ± 10% residual ripple)
- Residual ripple: ± 10% of $U_B$
- Bias current: ≤ 50mA (without load)
- Switching output: 2 PNP transistors
- Function characteristics: switching in case of object recognition
- Output current: 300mA
- Switching range adjustment: potentiometer 270°

Indicators
- Yellow LED
- Flashing yellow LED

Mechanical data
- Housing: metal / CuZn
- Weight: 340g
- Connection type: M12 connector, plastic, 5-pin

Environmental data
- Ambient temp. (operation/storage): -25°C ... +70°C /-40°C ... +85°C
- Protective circuit: 1, 2, 3
- VDE safety class: III
- Protection class: IP 65
- Standards applied: IEC 60947-5-2
- Fitting position: any

Remarks
- Approved purpose: The ultrasonic sensors are used for acoustic, contactless detection of objects.

Characteristics curve of switching outputs:

Order guide

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRTU 430M/P-2110-3000-S12</td>
<td>500 36263</td>
</tr>
</tbody>
</table>

Tables

<table>
<thead>
<tr>
<th>Typ. response behaviour (object 50x50mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance x [m]</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>0.0</td>
</tr>
<tr>
<td>0.6</td>
</tr>
<tr>
<td>1.2</td>
</tr>
<tr>
<td>1.8</td>
</tr>
<tr>
<td>2.4</td>
</tr>
<tr>
<td>3.0</td>
</tr>
</tbody>
</table>

Remarks
- Synchronisation: Mutual interference is excluded by connecting the sensors with the SYNC input.

Configuration software “USDS-Config”
- The configuration software runs under Windows 95/98/NT/2000/XP and offers the following features:
  - Configuration of multiplex operation
  - Configuration of the sensor (attenuation, switching frequency, response time)
  - Adjustment of the switching output (start/end of switching range, hysteresis, object present yes/no)
  - Adjustment of the analogue output
  - Support of various languages
Ideal for detection of levels of liquids, bulk materials, transparent media, ...
Distance information largely independent of surface properties
PC-configuration software for configuring sensor and switching output
Up to 10 devices can be synchronised via the SYNC input
Separate adjustment of start and end of switching range (Q1) via potentiometer and PC

600 ... 6000 mm

20 - 30 V DC

Accessories:
(available separately • see page 42)
- Cable with M12 connector (K-D …)
- "USDS-Config" configuration software (free download from www.leuze.com)
- PGU 01 (programming unit)

Electrical connection

Switching outputs Q1 and Q2 switch alternately!
Specifications

Ultrasonic specifications

<table>
<thead>
<tr>
<th>Operating range 1)</th>
<th>600 ... 6000mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasonic frequency</td>
<td>80kHz</td>
</tr>
<tr>
<td>Opening angle</td>
<td>6°</td>
</tr>
<tr>
<td>Resolution</td>
<td>≥ 1 mm</td>
</tr>
<tr>
<td>Absolute measurement accuracy</td>
<td>± 1.5% of the measurement range end value</td>
</tr>
<tr>
<td>Reproducibility</td>
<td>± 9 mm</td>
</tr>
</tbody>
</table>

Timing

| Switching frequency (min.) 2) | 1 Hz |
| Response time (max.) 2) | 400 ms |
| Delay before start-up | 280 ms |

Electrical data

| Operating voltage U_B | 20 ... 30V DC (incl. ± 10% residual ripple) |
| Residual ripple | ± 10% of U_B |
| Bias current | ≤ 50mA (without load) |
| Switching output | 2 PNP transistors |
| Function characteristics | switching in case of object recognition |
| Output current | 300mA |
| Switching range adjustment | potentiometer 270° |

Indicators

| Yellow LED | output activated |
| Flashing yellow LED | programming error |

Mechanical data

| Housing | metal / CuZn |
| Weight | 380g |
| Connection type | M12 connector, plastic, 5-pin |

Environmental data

| Ambient temp. (operation/storage) | -25°C ... +70°C/-40°C ... +85°C |
| Protective circuit 3) | 1, 2, 3 |
| VDE safety class | III |
| Protection class | IP 65 |
| Standards applied | IEC 60947-5-2 |
| Fitting position | any |

1) For the complete temperature range, measured object ≥ 100x100 mm
2) Can be configured up to 3 times faster using "USDS-Config"
3) 1=short-circuit and overload protection, 2=polarity reversal protection, 3=wire break and inductive protection

Remarks

- **Approved purpose:** The ultrasonic sensors are used for acoustic, contactless detection of objects.

Characteristic curve of switching outputs:

- **H_B**
  - Q1: Start of switching range Q1, end of switching range Q2
  - Q2: End of switching range Q1, start of switching range Q2
  - A: Measurement distance

Order guide

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRTU 430M/P-1110-6000-S12</td>
<td>500 36264</td>
</tr>
</tbody>
</table>

Tables

**Typ. response behaviour**

<table>
<thead>
<tr>
<th>Distance x [m]</th>
<th>Misalignment y [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>-550</td>
<td>-50</td>
</tr>
<tr>
<td>-450</td>
<td>50</td>
</tr>
<tr>
<td>-350</td>
<td>150</td>
</tr>
<tr>
<td>-250</td>
<td>250</td>
</tr>
<tr>
<td>-150</td>
<td>350</td>
</tr>
<tr>
<td>0</td>
<td>450</td>
</tr>
<tr>
<td>1</td>
<td>550</td>
</tr>
</tbody>
</table>

Remarks

- **Synchronisation:** Mutual interference is excluded by connecting the sensors with the SYNC input.

Configuration software “USDS-Config”

The configuration software runs under Windows 95/98/NT/2000/XP and offers the following features:

- Configuration of multiplex operation
- Configuration of the sensor (attenuation, switching frequency, response time)
- Adjustment of the switching output (start/end of switching range, hysteresis, object present yes/no)
- Adjustment of the analogue output
- Support of various languages
HRTU 418
Ultrasonic distance sensors

- Ideal for detection of levels of liquids, bulk materials, transparent media, ...
- Distance information largely independent of surface properties
- PC-configuration software for configuring sensor and analogue output
- Up to 10 devices can be synchronised via the SYNC input

Accessories:
(available separately • see page 42)
- Mounting systems
- Cable with M12 connector (K-D ...)
- "USDS-Config" configuration software (free download from www.leuze.com)
- PGU 01 (programming unit)

Dimensioned drawing

Electrical connection

<table>
<thead>
<tr>
<th>HRTU 418 M/V 3010...</th>
<th>HRTU 418 M/V 3310...</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–30V DC+</td>
<td>20–30V DC+</td>
</tr>
<tr>
<td>SYNC</td>
<td>SYNC</td>
</tr>
<tr>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>4–20mA</td>
<td>0–10V</td>
</tr>
<tr>
<td>br/BN</td>
<td>br/BN</td>
</tr>
<tr>
<td>ws/WH</td>
<td>ws/WH</td>
</tr>
<tr>
<td>bl/BU</td>
<td>bl/BU</td>
</tr>
<tr>
<td>sw/BK</td>
<td>sw/BK</td>
</tr>
</tbody>
</table>
Specifications

Ultrasonic specifications

<table>
<thead>
<tr>
<th>Operating range 1)</th>
<th>HRTU...-5x10-300...</th>
<th>HRTU...-3x10-1000...</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 ... 300mm</td>
<td>150 ... 1000mm</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ultrasonic frequency</th>
<th>400kHz</th>
<th>200kHz</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Opening angle</th>
<th>6°</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Resolution</th>
<th>1mm</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Absolute measurement accuracy</th>
<th>± 2.5% of the measurement range end value</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Reproducibility</th>
<th>± 1mm</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Switching hysteresis</th>
<th>10mm</th>
</tr>
</thead>
</table>

Timing

<table>
<thead>
<tr>
<th>Switching frequency (min.) 2)</th>
<th>5Hz</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Response time (max.) 2)</th>
<th>100ms</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Delay before start-up</th>
<th>280ms</th>
</tr>
</thead>
</table>

Electrical data

<table>
<thead>
<tr>
<th>Operating voltage $U_B$</th>
<th>20 ... 30V DC (incl. ± 10% residual ripple)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Residual ripple</th>
<th>± 10% of $U_B$</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Bias current</th>
<th>≤ 60mA</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Switching output</th>
<th>analogue</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Current output</th>
<th>only HRTU...-x010-...</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Load resistor</th>
<th>$R_L = 0 ... 300\Omega$</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Characteristic curve</th>
<th>ascending</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Voltage output</th>
<th>only HRTU...-x310-...</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Output voltage</th>
<th>0 ... 10V</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Load resistor</th>
<th>$R_L \geq 500\Omega$</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Characteristic curve</th>
<th>ascending</th>
</tr>
</thead>
</table>

Indicators

<table>
<thead>
<tr>
<th>Yellow LED</th>
<th>object detected</th>
</tr>
</thead>
</table>

Mechanical data

<table>
<thead>
<tr>
<th>Housing</th>
<th>metal / CuZn</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Weight</th>
<th>50g</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Connection type</th>
<th>M12 connector, plastic, 4-pin</th>
</tr>
</thead>
</table>

Environmental data

<table>
<thead>
<tr>
<th>Ambient temp. (operation/storage)</th>
<th>-25°C ... +70°C/-40°C ... +85°C</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Protective circuit 3)</th>
<th>1, 2, 3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>VDE safety class</th>
<th>III</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Protection class</th>
<th>IP 67</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Standards applied</th>
<th>IEC 60947-5-2</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Fitting position</th>
<th>any</th>
</tr>
</thead>
</table>

1) For the complete temperature range, measured object ≥ 10x10mm
2) Can be configured up to 3 times faster using “USDS-Config”
3) 1=short-circuit and overload protection, 2=no polarity reversal protection, 3=wire break and inductive protection

Remarks

- Approved purpose:
The ultrasonic distance sensors are used for acoustic, contactless detection of objects.

Order guide

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output</td>
<td>HRTU 418M/V-5010-300-S12</td>
</tr>
<tr>
<td>Current output</td>
<td>HRTU 418M/V-3010-1000-S12</td>
</tr>
<tr>
<td>Voltage output</td>
<td>HRTU 418M/V-5310-300-S12</td>
</tr>
<tr>
<td>Voltage output</td>
<td>HRTU 418M/V-3310-1000-S12</td>
</tr>
</tbody>
</table>

Tables

<table>
<thead>
<tr>
<th>Distance x [mm]</th>
<th>Typ. response behaviour (object 10x10mm)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Distance x [mm]</th>
<th>Typ. response behaviour (object 10x10mm)</th>
</tr>
</thead>
</table>

Remarks

- Synchronisation: Mutual interference is excluded by connecting the sensors with the SYNC input.

Configuration software “USDS-Config”
The configuration software runs under Windows 95/98/NT/2000/XP and offers the following features:

- Configuration of multiplex operation
- Configuration of the sensor (attenuation, switching frequency, response time)
- Adjustment of the switching output (start/end of switching range, hysteresis, object present yes/no)
- Adjustment of the analogue output
- Support of various languages
Ideal for detection of levels of liquids, bulk materials, transparent media,…

- Distance information largely independent of surface properties
- 1 analogue output, 1 switching output
- PC-configuration software for configuring sensor and switching output / analogue output
- Up to 10 devices can be synchronised via the SYNC input
- Separate adjustment of start and end of switching range (Q1) via potentiometer and PC

60 ... 300 mm
200 ... 1300 mm

Accessories:
(available separately • see page 42)
- Cable with M12 connector (K-D …)
- "USDS-Config" configuration software (free download from www.leuze.com)
- PGU 01 (programming unit)

Electrical connection

![Dimensioned drawing]

A Potentiometer for end of switching range Q1
B Indicator diode Q1
C Potentiometer for start of switching range Q1
Specifications

Ultrasonic specifications

<table>
<thead>
<tr>
<th>Operating range 1)</th>
<th>VRTU…-5x10-300…</th>
<th>VRTU…-3x10-1300…</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 … 300 mm</td>
<td>200 … 1300 mm</td>
<td></td>
</tr>
<tr>
<td>400kHz</td>
<td>200kHz</td>
<td></td>
</tr>
<tr>
<td>≤ 1 mm</td>
<td>≥ 1 mm</td>
<td></td>
</tr>
<tr>
<td>± 0.45 mm</td>
<td>± 2 mm</td>
<td></td>
</tr>
<tr>
<td>10 mm</td>
<td>10 mm</td>
<td></td>
</tr>
<tr>
<td>potentiometer 270°</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Switching frequency (min.) 2)

| 8Hz                | 4Hz               |
| 80ms               | 110ms             |
| 280ms              | 280ms             |

Electrical data

| Operating voltage U_B | 20 … 30VDC (incl. ± 10% residual ripple) |
| Bias current          | ≤ 50mA (without load)                     |
| Outputs               | 1 PNP transistor, 1 analogue output       |

Vibration output

| Output current (PNP) | 4 … 20mA    |
| Characteristic curve | R_L = 300Ω |
| Voltage output       | 0 … 10V     |
| Load resistor        | R_L ≥ 500Ω  |

Indicators

| Output activated      |
| Programming error     |

Mechanical data

| Housing               | metal / CuZn |
| Weight               | 210g         |

Environmental data

| Ambient temp. (operation/storage)  | -25°C … +70°C/-40°C … +85°C |
| Protective circuit 3)             | 1, 2, 3 |
| VDE safety class                | III      |
| Protection class                | IP 65    |
| Standards applied               | IEC 60947-5-2 |

Remarks

- **Approved purpose:**
The ultrasonic distance sensors are used for acoustic, contactless detection of objects.

Order guide

<table>
<thead>
<tr>
<th>Current output</th>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output</td>
<td>VRTU 430M/V-5710-300-S12</td>
<td>500 36266</td>
</tr>
<tr>
<td>Current output</td>
<td>VRTU 430M/V-3710-1300-S12</td>
<td>500 36267</td>
</tr>
<tr>
<td>Voltage output</td>
<td>VRTU 430M/V-5510-300-S12</td>
<td>500 40771</td>
</tr>
<tr>
<td>Voltage output</td>
<td>VRTU 430M/V-3510-1300-S12</td>
<td>500 40772</td>
</tr>
</tbody>
</table>

Tables

<table>
<thead>
<tr>
<th>Distance x (mm)</th>
<th>Distance y (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Remarks

- **Synchronisation:**
  Mutual interference is excluded by connecting the sensors with the SYNC input.

Configuration software “USDS-Config”

The configuration software runs under Windows 95/98/NT/2000/XP and offers the following features:

- Configuration of multiplex operation
- Configuration of the sensor (attenuation, switching frequency, response time)
- Adjustment of the switching output (start/end of switching range, hysteresis, object present yes/no)
- Adjustment of the analogue output
- Support of various languages
**VRTU 430**

**Ultrasonic distance sensors**

---

**Features:**
- Ideal for detection of levels of liquids, bulk materials, transparent media, ...
- Distance information largely independent of surface properties
- Analogue current output or voltage output, 1 switching output
- All settings are adjustable
- Up to 10 devices can be synchronised via the SYNC input
- Start and end of switching range adjustable separately

**Technical Specifications:**
- Distance range: 400 ... 3000 mm
- Power supply: 20 - 30 V DC

---

**Dimensioned drawing**

[Diagram showing dimensions and components]

---

**Electrical connection**

[Table showing electrical connections]

---

**Accessories:**
- Programming software “USDS-Config”
- PGU 01 (programming unit)

---

**LISTED**
- IEC 60947...
- UL
- IP 65
Specifications

Ultrasonic specifications
- Operating range 1) 400 ... 3000mm
- Ultrasonic frequency 120kHz
- Opening angle 6°
- Resolution ≥ 1mm
- Absolute measurement accuracy ± 1.5% of the measurement range end value
- Reproducibility ± 5mm
- Switching hysteresis 20mm

Timing
- Switching frequency 24Hz
- Response time 200ms
- Delay before start-up 280ms

Electrical data
- Operating voltage $U_B$ 20 ... 30VDC (incl. ± 10% residual ripple)
- Residual ripple ± 10% of $U_B$
- Bias current < 60mA
- Outputs 1 PNP transistor, 1 analogue current output, 1 analogue voltage output
- Function characteristics switching in case of object recognition
- Output current (PNP switching output) max. 300mA
- Analog output 4 ... 20mA, 0 ... 10V
- Load resistance (analogue output) $R_L \geq 2k\Omega$
- Characteristic curve ascending
- Switching range adjustment potentiometer 270°

Indicators
- Yellow LED output activated
- Flashing yellow LED programming error

Mechanical data
- Housing metal / CuZn
- Weight 340g
- Connection type M12 connector, plastic, 5-pin

Environmental data
- Ambient temp. (operation/storage) -25°C ... +70°C/-40°C ... +85°C
- Protective circuit 2) 1, 2, 3
- VDE safety class III
- Protection class IP 65
- Standards applied IEC 60947-5-2
- Fitting position any

Remarks

Approved purpose: The ultrasonic distance sensors are used for acoustic, contactless detection of objects.

Order guide

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>With analogue current output</td>
<td>VRTU 430M/V-2710-3000-S12</td>
</tr>
<tr>
<td>With analogue voltage output</td>
<td>VRTU 430M/V-2510-3000-S12</td>
</tr>
</tbody>
</table>

Tables

<table>
<thead>
<tr>
<th>Distance x [m]</th>
<th>Misalignment y [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0.5</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1.5</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>3.5</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Diagrams

Typ. response behaviour (object 50x50mm)

Remarks

- Synchronisation: Mutual interference is excluded by connecting the sensors with the SYNC input.
- Multiplex: Achieved by configuring the sensors with the "USDS-Config" software.
VRTU 430

Ideal for detection of levels of liquids, bulk materials, transparent media, …

Distance information largely independent of surface properties

Analogue current output, 1 switching output

PC-configuration software for configuring sensor and switching output / analogue output

Up to 10 devices can be synchronised via the SYNC input

Separate adjustment of start and end of switching range (Q1) via potentiometer and PC

600 ... 6000 mm

Accessories:

- Cable with M12 connector (K-D …)
- "USDS-Config" configuration software (free download from www.leuze.com)
- PGU 01 (programming unit)

UL

LISTED

IEC 60947...

IEC 60947...

IP 65

Electrical connection

![](image)

A Potentiometer for end of switching range Q1
B Indicator diode Q1
C Potentiometer for start of switching range Q1
Specifications

Ultrasonic specifications
Operating range 1) 600 ... 6000mm
Ultrasonic frequency 80kHz
Opening angle 6°
Resolution ≥ 1mm
Absolute measurement accuracy ± 1.5% of the measurement range end value
Reproducibility ± 9mm
Switching hysteresis 60mm

Timing
Switching frequency (min.) 2) 1Hz
Response time (max.) 2) 400ms
Delay before start-up 280ms

Electrical data
Operating voltage $U_B$ 20 ... 30VDC (incl. ± 10% residual ripple)
Residual ripple ± 10% of $U_B$
Bias current < 60mA
Outputs 1 PNP transistor,
1 analogue output
Function characteristics switching in case of object recognition
Output current (PNP/analogue) 300mA/4 ... 20mA
Analogue output $R_L$ 0 ... 300Ω
Characteristic curve ascending
Switching range adjustment potentiometer 270°

Indicators
Yellow LED output activated
Flashing yellow LED programming error

Mechanical data
Housing metal / CuZn
Weight 380g
Connection type M12 connector, plastic, 5-pin

Environmental data
Ambient temp. (operation/storage) -25°C ... +70°C/-40°C ... +85°C
VDE safety class III
Protection class IP 65
Standards applied IEC 60947-5-2
Fitting position any

Remarks
● Approved purpose:
The ultrasonic distance sensors are used for acoustic, contactless detection of objects.

Order guide

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRTU 430M/V-1710-6000-S12</td>
<td>500 36269</td>
</tr>
</tbody>
</table>

Tables

Diagrams

Typ. response behaviour (object 100x100mm)

<table>
<thead>
<tr>
<th>Distance x [m]</th>
<th>Misalignment y [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-550</td>
</tr>
<tr>
<td>1</td>
<td>-450</td>
</tr>
<tr>
<td>2</td>
<td>-350</td>
</tr>
<tr>
<td>3</td>
<td>-250</td>
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<tr>
<td>4</td>
<td>-150</td>
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<tr>
<td>5</td>
<td>-50</td>
</tr>
<tr>
<td>6</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>150</td>
</tr>
<tr>
<td>8</td>
<td>250</td>
</tr>
<tr>
<td>9</td>
<td>350</td>
</tr>
<tr>
<td>10</td>
<td>450</td>
</tr>
</tbody>
</table>

Remarks
● Synchronisation:
  Mutual interference is excluded by connecting the sensors with the SYNC input.

Configuration software “USDS-Config”
The configuration software runs under Windows 95/98/NT/2000/XP and offers the following features:
● Configuration of multiplex operation
● Configuration of the sensor (attenuation, switching frequency, response time)
● Adjustment of the switching output (start/end of switching range, hysteresis, object present yes/no)
● Adjustment of the analogue output
● Support of various languages

1) For the complete temperature range, measured object ≥ 100x100 mm
2) Can be configured up to 3 times faster using “USDS-Config”
3) 1=short-circuit and overload protection, 2=no polarity reversal protection, 3=wire break and inductive protection
We reserve the right to make changes.

**Accessories Ultrasonic sensors**

**Connectors, cables**

The following connectors are available for devices with M12 connectors: angled or straight, with and without cable connection.

Protection class (DIN 40050) plugged and screwed down: IP 67

**Important:**

With throughbeam photoelectric sensors, a connector is required both for the transmitter and the receiver.

**Dimensioned drawings**

- KD 095-4
- KD 095-5
- KD 095-4A
- KD 095-5A

- K-D M12W-4P-...
- K-D M12W-5P-...
- K-D M12W-4P-...
- K-D M12W-5P-...

USD accessories - M18, M30S
## Selection table

### M12 connector, user-configurable

<table>
<thead>
<tr>
<th>Connection type</th>
<th>Without cable, 4-pin</th>
<th>Without cable, 5-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw terminals</td>
<td>KD 095-4</td>
<td>KD 095-4A</td>
</tr>
<tr>
<td>Part No.</td>
<td>500 31324</td>
<td>500 31323</td>
</tr>
</tbody>
</table>

### M12 connection cable with connector, single-sided

#### PVC cable sheath, 4-pin

<table>
<thead>
<tr>
<th>Length</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2m</td>
<td>K-D M12W-4P-2m-PVC 501 04543</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-4P-2m-PVC 501 04542</td>
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<tr>
<td>5m</td>
<td>K-D M12W-4P-5m-PVC 501 04545</td>
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<tr>
<td></td>
<td>K-D M12A-4P-5m-PVC 501 04544</td>
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<tr>
<td>10m</td>
<td>K-D M12W-4P-10m-PVC 501 04547</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-4P-10m-PVC 501 04546</td>
</tr>
<tr>
<td>20m</td>
<td>K-D M12A-4P-20m-PVC 501 04753</td>
</tr>
</tbody>
</table>

#### PUR cable sheath, 4-pin

<table>
<thead>
<tr>
<th>Length</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2m</td>
<td>K-D M12W-4P-2m-PUR 501 04562</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-4P-2m-PUR 501 04561</td>
</tr>
<tr>
<td>5m</td>
<td>K-D M12W-4P-5m-PUR 501 04564</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-4P-5m-PUR 501 04563</td>
</tr>
<tr>
<td>10m</td>
<td>K-D M12W-4P-10m-PUR 501 04566</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-4P-10m-PUR 501 04565</td>
</tr>
</tbody>
</table>

## Connectors, cables

### M12 connection cable with connector, single-sided

#### PVC cable sheath, 5-pin

<table>
<thead>
<tr>
<th>Length</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2m</td>
<td>K-D M12W-5P-2m-PVC 501 04556</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-5P-2m-PVC 501 04555</td>
</tr>
<tr>
<td>5m</td>
<td>K-D M12W-5P-5m-PVC 501 04558</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-5P-5m-PVC 501 04557</td>
</tr>
<tr>
<td>10m</td>
<td>K-D M12W-5P-10m-PVC 501 04560</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-5P-10m-PVC 501 04559</td>
</tr>
</tbody>
</table>

#### PUR cable sheath, 5-pin

<table>
<thead>
<tr>
<th>Length</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2m</td>
<td>K-D M12W-5P-2m-PUR 501 04568</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-5P-2m-PUR 501 04567</td>
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<tr>
<td>5m</td>
<td>K-D M12W-5P-5m-PUR 501 04762</td>
</tr>
<tr>
<td></td>
<td>K-D M12A-5P-5m-PUR 501 04569</td>
</tr>
</tbody>
</table>
Accessories Ultrasonic sensors

Mounting systems
BT 8-0 (Part No. 500 36196)

BT 8 (Part No. 500 36195)

Dimensioned drawings

BT 8-0

BT 8
### Dimensioned drawings

#### UMS 8-D...

- **A** Clamp
- **B** Rod
- **C** Sensor

#### UMS 8.1-D...

- **A** Mount
- **B** Joint
- **C** Clamp
- **D** Rod
- **E** Sensor

#### UMS 8.2-D...

- **A** Mount
- **B** Joint
- **C** Clamp
- **D** Rod
- **E** Sensor

#### BT 8-ARH

- **A** Mount
- **B** Joint
- **C** Clamp
- **D** Rod
- **E** Sensor

### Mounting systems

- **UMS 8-D10** (Ø10mm, Part No. 500 35020)
- **UMS 8-D12** (Ø12mm, Part No. 500 35021)
- **UMS 8-D14** (Ø14mm, Part No. 500 35022)

- **UMS 8.1-D10** (Ø10mm, Part No. 500 35023)
- **UMS 8.1-D12** (Ø12mm, Part No. 500 35024)
- **UMS 8.1-D14** (Ø14mm, Part No. 500 35025)

- **UMS 8.2-D10** (Ø10mm, Part No. 500 35026)
- **UMS 8.2-D12** (Ø12mm, Part No. 500 35027)
- **UMS 8.2-D14** (Ø14mm, Part No. 500 35028)

- **BT 8-ARH** (Part No. 500 35030)
Mounting systems

BT 8-D10 (Ø10mm, Part No. 500 35017)
BT 8-D12 (Ø12mm, Part No. 500 35018)
BT 8-D14 (Ø14mm, Part No. 500 35019)

BT 8-C15 (Part No. 500 35016)

BT 8-C35x7,5 (Part No. 500 35015)

Dimensioned drawings

BT 8-D...

A Clamp
B Rod diameter
C Mounting plate
D Washer
E Sensor

BT 8-C15

BT 8-C35x7,5
**Accessories Ultrasonic sensors**

**Configuration software**

USDS-Config

(free download from [www.leuze.com](http://www.leuze.com))

**Programming unit**

PGU 01 (Part No. 500 36559)

The USDS-Config software is supplied with the PGU 01 programming unit
Optical Electronic Sensors
Cubic Series
Cylindrical Sensors, Mini Sensors, Fibre Optic Amplifiers
Measuring Sensors
Special Sensors
Light Curtains
Forked Sensors
Double Sheet Monitoring, Splice Detection
Accessories
Identification Systems
Data Transmission Systems
Distance Measurement
Barcode Readers
RF IDent Systems
Modular Connector Units
Industrial Image Processing Systems
Optical Data Transmission Systems
Optical Distance Measurement/Positioning
Hand-Held Readers
Safety Sensors
Safety Systems
Safety Services
Safety Laser Scanners
Safety Light Curtains
Transceiver and Multiple Light Beam Safety Devices
Single Light Beam Safety Devices
AS-i-Safety Product Range
Safety Sensor Technology for PROFIBUSDP
Safety Switches and Safety Locking Devices
Safety Relays and Safety Interfaces
Sensor Accessories and Signal Devices
Safety Engineering Software
Machine Safety Services

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